

Serial No. 10/811,133

**Remarks**

Claims 1, 17, 19 and 20 have been amended. Accordingly, claims 1-20 are currently pending.

**I. Amendments:**

Claims 1, 17, 19 and 20 were amended to clarify that the emulsifier is selected from the group consisting of oxyalkylene phosphate esters and salts thereof, and oxyalkylene sulfate esters and salts thereof. Support for the amendments can be found in original claims and in the specification at page 3, line 32 to page 4, line 5. Accordingly, no new matter has been added.

**II. The Invention:**

The present invention relates to an aqueous dispersion useful for internal or surface sizing, as well as preparation and use thereof in the production of paper. The aqueous dispersion includes at least one cellulose reactive sizing agent selected from the group consisting of ketene dimers and multimers, at least one cellulose non-reactive sizing agent, and at least one emulsifier selected from the group consisting of oxyalkylene phosphate esters and salts thereof, and oxyalkylene sulfate esters and salts thereof.

It has been found that effective internal and surface sizing can be achieved by using a dispersion comprising both a ketene dimer or multimer and a cellulose non-reactive sizing agent, and that high stability of such dispersions can be obtained by including a special kind of emulsifier, namely, an oxyalkylene phosphate ester or a salt thereof or an oxyalkylene sulfate ester or a salt thereof.

Examples 1 and 2 of the present application show that the present sizing dispersion gives considerably improved sizing efficiency than conventional internal or surface sizes. Examples 3 and 4 further show that the present sizing dispersion has improved stability and particle size distribution, due to the presence of the emulsifier, as claimed.

**III. Rejections:**

Claims 1-12 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly pointing out and distinctly claiming the subject matter which the applicant regards as the invention. The Applicant respectfully traverses.

Serial No. 10/811,133

Applicant respectfully submits that the specific rejection of claim 1, as discussed in the Office Action at page 2, is now moot based on the amendment to claim 1.

Accordingly, it is respectfully requested that the rejection of claims 1-12 under 35 U.S.C. § 112 be withdrawn.

Claims 1 - 20 stand rejected under 35 U.S.C. § 103(a), as being obvious over Frölich et al. (US 6,306,255), in view of Wendel et al. (US 4,051,093). The Applicant respectfully traverses.

Frölich et al disclose a sizing composition comprising a cellulose-reactive sizing agent, a non-cellulose reactive sizing agent and a hydrophobically modified dispersing agent. Claim 1 of the present application is distinguished from Frölich et al by the presence of an emulsifier selected from the group consisting of oxyalkylene phosphate esters and salts thereof, and oxyalkylene sulfate esters and salts thereof, which has been found to solve the problem of providing a dispersion of high stability.

Wendel et al disclose a copolymer emulsion which may be used as a sizing agent for paper (column 6, lines 13-14; claim 1). Wendel et al also disclose a number of conventional cationic, anionic, amphoteric and non-ionic emulsifiers (column 5, lines 2-24). Wendel et al do not disclose, teach or suggest a combination of a cellulose reactive sizing agent selected from ketene dimers or multimers and a cellulose non-reactive sizing agent.

The Office Action contends that, in view of Wendel et al, it would have been obvious to a person skilled in the art to use an emulsifier selected from the group consisting of oxyalkylene phosphate esters and salts thereof, and oxyalkylene sulfate esters and salts thereof in the dispersion of Frölich et al. Applicant respectfully disagrees and submits that one skilled in the art would not have any reason to use the emulsifiers in combination with the sizing agents, as claimed, based on the combined teachings of Frölich et al. and Wendel et al. Applicant respectfully submits that the only reason a person skilled in the art would arrive at the presently claimed invention, based on these prior art teachings, is through the impermissible use of hindsight and that the only teaching to use the emulsifiers, as presently claimed, comes from the instant application.

Although Frölich et al disclose a combination of a cellulose-reactive sizing agent and cellulose non-reactive sizing agent, Applicant respectfully submits that there is no teaching or suggestion that a dispersion of high stability could be obtained by selecting an emulsifier as

Serial No. 10/811,133

defined in claim 1 of the present application. It is further submitted that there is no guidance on how to select an emulsifier from among the thousands of emulsifiers known per se, including those mentioned in Wendel et al., in order to provide stabile dispersions. Moreover, it is respectfully submitted that Frolich et al. teach away from the presently claimed invention and from using conventional emulsifiers, by teaching that the emulsifier must be hydrophobically modified (column 3, line 29 to column 4, line 24). Although Frolich et al. teach that the dispersing agent can be anionic in nature, e.g., containing sulphate groups, they do not teach or suggest using any agent containing sulphate groups per se. In fact, Frolich et al. specifically teach that the dispersing agent must be hydrophobically modified.

Wendel et al disclose among other emulsifiers anionic emulsifiers such as alkyl sulfates, alkyl-sulfonates and alkyl-phosphates which may be in the in the form of adduct with ethylene oxide (column 5, lines 12-15). However, Applicant respectfully submits that there is no teaching or suggestion that oxyalkylene phosphate esters or salts thereof or oxyalkylene sulfate esters or salts thereof would be suitable for stabilizing a dispersion that includes both a ketene dimer or multimer and a cellulose non-reactive sizing agent.

Wendel et al teach that it is not necessary to have emulsifiers present in the process of emulsion polymerization in an aqueous medium containing conventional polymerization initiators to obtain shear-resistant emulsions (column 4, line 65- column 5, line 2). Wendel et al further teach that cationic emulsifiers are preferable, such as salts of fatty amines (column 5, line 4). However, Applicant has found that use of an emulsifier, as claimed, results in an unexpected improvement in stability of the dispersion compared to use of only a salt of a fatty amine. See Example 3, where use of a polyoxyethylene phosphate ester improved stability of the dispersion compared to using just a ditallow dimethyl ammonium chloride.

Applicant respectfully submits that neither Frölich et al nor Wendel et al, when read alone or in combination, disclose, suggest or teach that it would be possible or desirable to select an emulsifier as defined in independent claims 1, 13, 17, 19 and 20 of the present application for stabilizing a dispersion that includes both a ketene dimer or multimer and a cellulose non-reactive sizing agent. Therefore, it is respectfully submitted that the invention according to claims 1, 13, 17, 19 and 20 is not obvious in view of these cited references.

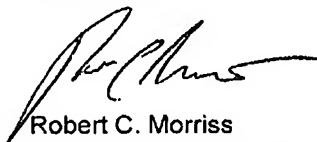
Accordingly, it is respectfully requested that the rejections of claims 1-20 under 35 U.S.C. § 103(a), as being obvious over Frolich et al., in view of Wendel et al., be withdrawn.

Serial No. 10/811,133

**IV. Conclusion:**

In light of the foregoing, Applicant respectfully submits that the application as amended is now in proper form for allowance, which action is earnestly solicited. If the Examiner has any questions relating to this Amendment or to this application in general, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,



Robert C. Morriss  
Attorney for Applicants  
Registration No.: 42,910

Akzo Nobel Inc.  
Intellectual Property Dept.  
120 White Plains Road, Suite 300  
Tarrytown, New York 10591  
(914) 333-7450